

ABSTRACT OF THE DISCLOSURE

An in vitro, three dimensional artificial tissue that resembles human skin has been developed. Microvascular endothelial cells from human adult lung were sandwiched between two layers of human dermal fibroblasts in three dimensional collagen gels. The sandwich was covered with keratinocytes. The cultures were self-maintained for prolonged periods of time without the addition of tumor promoters such as phorbol esters. Over a few days, the keratinocytes developed into a multilayered epithelium. Microvessels were produced in the support matrix. The microvessels were composed of a tight monolayer of endothelial cells surrounded by a continuous basal lamina, contacted by newly formed, sparse perioendothelial cells. The microvessels also contained newly formed blood cells. Human matrix molecules characteristic of skin were produced. This artificial tissue is an in vitro system that closely resembles human skin, and provides both a powerful model to study cellular and molecular mechanisms involved in skin development and replacement and a basis for a new generation skin replacement product.